

REMARKS

In the Office Action mailed on July 13, 2005, claims 21-52 were pending. Claims 21-52 were rejected.

Claims 21, 25, 43, 48 and 51 have been amended. The proposed amendments do not contain new matter. The subject matter of the amendments can be found in the originally filed specification on page 8 and in the originally filed claims, among other places. Applicants respectfully request admission of the amended claims.

Claims 38-42, 50 and 52 have been cancelled and are no longer pending.

I. Rejection under 35 U.S.C. § 102

In the Office Action at page 3, paragraph 5, claims 21-52 were rejected under 35 U.S.C. §102(e) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Gibbons. Applicants respectfully traverse this rejection.

A. The Present Invention

The present invention as recited in amended claim 21 is a coated product comprising a substrate; a film sputtered from a metal cathode target in an atmosphere comprising inert gas and reactive gas, the metal in the metal cathode target having a reactive gas switch point, wherein the concentration of the reactive gas during sputtering is below the reactive gas switch point such that the metal target is sputtered in a metallic mode to deposit a metal film having an amorphous structure defined as an amorphous metal film; and a second metal oxide film over the amorphous metal film, wherein the amorphous metal film is oxidized to form a first metal oxide film in the coated product.

The present invention as recited in claim 43 is a coated article comprising a glass substrate, a first titanium oxide film formed by thermally oxidizing an amorphous sputtered titanium metal film deposited from a titanium metal cathode target in an atmosphere comprising argon and oxygen below a reactive switch point of the titanium metal cathode target, and a second titanium oxide film deposited over the first titanium oxide film.

The present invention as recited in amended claim 48 is a coated product consisting essentially of: a substrate; and a metal oxide film from oxidation of an essentially amorphous metal film sputtered from a metal cathode target in an atmosphere comprising inert gas and reactive gas, the metal in the metal cathode target having a reactive gas switch point, wherein the concentration of the reactive gas during sputtering is below the reactive gas switch point such that the metal target is sputtered in a metallic mode to deposit a metal film having an amorphous structure.

The present invention as recited in amended claim 51 is a coated product comprising a substrate; and a metal oxide film comprised of crystalline metal oxide from oxidation of an essentially amorphous metal film sputtered from a metal cathode target in an atmosphere comprising inert gas and reactive gas, the metal in the metal cathode target having a reactive gas switch point, wherein the concentration of the reactive gas during sputtering is below the reactive gas switch point such that the metal target is sputtered in a metallic mode to deposit a metal film having an amorphous structure; and a metal oxide film directly over the crystalline metal oxide film, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film.

B. Gibbons

Gibbons discloses a plastic substrate with layers of functional metals having an oxide heat of formation that is greater than -40,000 calories/gram atom of metal, such as silver, copper, gold, and the like, and a thin layer of a metal having an oxide heat of formation of less than -50,000 calories/gram atom of metal is present as an adhesion-promoting primer layer.

C. Traversal of the Rejection

For a proper rejection under 35 U.S.C. § 102, the cited reference must disclose each and every limitation of the invention.

The present invention as recited in amended claim 21 is a coated product comprising a **second metal oxide film** over the amorphous metal film, wherein the amorphous metal film is oxidized to form a **first metal oxide film** in the coated product. In contrast to the present invention, Gibbons discloses a plastic substrate having a primer layer made up of a pure

metal or a partially oxidized metal and a **metal layer directly over the primer layer**. Gibbons discloses a metal layer directly over the primer layer because the invention relates to an adhesion promoting layer for improving the adhesion between a metal layer and a plastic substrate. Hence, Gibbons does not disclose **a second oxide film deposited directly over a first oxide film** as recited in claim 21. As a result, Gibbons does not anticipate the present invention as recited in claim 21, and Applicants request consideration and allowance of claim 21.

Claims 22-35, 44-47 and 49 directly or indirectly depend on claim 21 and recite the present invention in varying scope. Applicants have discussed above how claim 21 is not anticipated by over the cited reference, and claims 22-35, 44-47 and 49 are similarly not anticipated by Gibbons. As a result, Applicants respectfully request the consideration and allowance of claims 22-35, 44-47 and 49.

The present invention as recited in amended claim 43 is a coated article comprising **a second titanium oxide film deposited directly over the first titanium oxide film**. In contrast to the present invention, Gibbons discloses a plastic substrate having primer layer made up of a pure metal or a partially oxidized metal and a **metal layer directly over the primer layer**. Further, Gibbons cannot disclose titanium oxide as both the metal layer and the primer layer in the stack in light of the way the materials for both layers are defined. The layers must be different materials since (a) the functional metals are defined as having an oxide heat of formation that is greater than -40,000 calories/gram atom of metal, such as silver, copper, gold, and the like, and (b) the thin layer of metal (i.e., the adhesion-promoting primer layer) is defined as having an oxide heat of formation of less than -50,000 calories/gram atom.

Hence, Gibbons does not disclose **a second titanium oxide film deposited directly over a first titanium oxide film** as recited in claim 43. Both layers comprise titanium dioxide in the invention which is an impossibility in Gibbons. As a result, Gibbons does not anticipate the present invention as recited in claim 43, and Applicants request consideration and allowance of claim 43.

Amended claim 48 recites a coated product consisting essentially of a substrate and a metal oxide film. The transition language “consisting essentially of” basically limits claim 48 to the substrate and the recited metal oxide film. No additional films that affect the performance of the coated substrate such as the metal film in Gibbons can be present. As discussed above, Gibbons discloses a metal layer over an adhesion-promoting primer layer. Therefore, claim 48 is not anticipated by Gibbons, and Applicants respectfully request the consideration and allowance of claim 48.

Similarly to claim 21, claim 51 recites a coated product having a **metal oxide film directly over the crystalline metal oxide film**, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film. For the reasons discussed above, Gibbons does not disclose an **oxide film** deposited directly over a crystalline metal oxide film as recited in claim 51. As a result, Gibbons does not anticipate the present invention as recited in claim 51, and Applicants request consideration and allowance of claim 51.

Claims 36 and 37 depend on claim 51 and recite the present invention in varying scope. Applicants have discussed above how claim 51 is not anticipated by over the cited reference, and claims 36 and 37 are similarly not anticipated by Gibbons. As a result, Applicants respectfully request the consideration and allowance of claims 36 and 37.

II. Rejection under 35 U.S.C. § 103

A. Rejection of Claims 21-52 over U.S. Patent No. 5,589,280 (“Gibbons”)

This rejection is discussed in detail above. For a proper rejection under 35 U.S.C. § 103, the PTO must satisfy three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. See In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the

vantage point of the skilled artisan at the time the invention was made. See Amgen, Inc., 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed Cir. 1991). Lastly, the prior art reference or combination of references must teach or suggest all the limitations of the claims. See In re Wilson, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

The present invention as recited in amended claim 21 is a coated product comprising a **second metal oxide film** over the amorphous metal film, wherein the amorphous metal film is oxidized to form a **first metal oxide film** in the coated product. In contrast to the present invention, Gibbons teaches a plastic substrate having a primer layer made up of a pure metal or a partially oxidized metal and a **metal layer directly over the primer layer**. Gibbons teaches a metal layer directly over the primer layer because the invention relates to an adhesion promoting layer for improving the adhesion between a metal layer and a plastic substrate. As a result, Gibbons does not teach or suggest all the limitations of claim 21, and claim 21 is patentably distinguishable over Gibbons. Applicants respectfully request the consideration and allowance of claim 21.

Claims 22-35, 44-47 and 49 directly or indirectly depend on claim 21 and recite the present invention in varying scope. Applicants have discussed above how claim 21 is patentably distinguishable over the cited reference, and claims 22-35, 44-47 and 49 are similarly patentably distinguishable over Gibbons. As a result, Applicants respectfully request the consideration and allowance of claims 22-35, 44-47 and 49.

The present invention as recited in amended claim 43 is a coated article comprising a second titanium oxide film deposited directly over the first titanium oxide film. In contrast to the present invention, Gibbons teaches a plastic substrate having primer layer made up of a pure metal or a partially oxidized metal and a **metal layer directly over the primer layer**. Gibbons does not teach a **second titanium oxide film deposited directly over a first titanium oxide film** as recited in claim 43. Further, for the reasons discussed above, Gibbons cannot teach two successive layers of titanium oxide based on how the layers in Gibbons are defined. As a result, the present invention as recited in claim 43 is patentably distinguishable over Gibbons, and Applicants request consideration and allowance of claim 43.

Amended claim 48 recites a coated product **consisting essentially** of a substrate and a metal oxide film. As discussed above, Gibbons teaches an adhesion-promoting layer and **a metal layer**. As a result, Gibbons does not teach or suggest all the limitations of claim 48 so claim 48 is patentably distinguishable over Gibbons. Applicants respectfully request the consideration and allowance of claim 48.

Similarly to claim 43, claim 51 recites a coated product having a **metal oxide film directly over the crystalline metal oxide film**, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film. For the reasons discussed above, Gibbons does not teach a **metal oxide film deposited directly over a crystalline metal oxide film** as recited in claim 51. As a result, the present invention as recited in claim 51 is patentably distinguishable over Gibbons, and Applicants request consideration and allowance of claim 51.

Claims 36 and 37 depend on claim 51 and recite the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over the cited reference, and claims 36 and 37 are similarly patentably distinguishable over Gibbons. As a result, Applicants respectfully request the consideration and allowance of claims 36 and 37.

B. Rejection of Claim 37 over Gibbons in view of U.S. Patent No. 4,188,452 (“Groth”)

In the Office Action at page 6, paragraph 7, claim 37 is rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons as applied to claims 21-52 above and further in view of Groth. The Examiner stated that Gibbons does not mention a thermal oxidation temperature range, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to thermally oxidize at a temperature between 400°C and 500°C as taught by Groth. Applicants respectfully traverse this rejection.

1. Groth

Groth discloses a heat reflecting pane comprising a substantially transparent glass substrate which has a layer of silicon oxide thereon and a layer of titanium dioxide in the rutile form on the side of the silicon oxide layer remote from the glass pane, where the glass substrate having been toughened by heat treatment. The pane is formed by coating the

glass substrate with a thin layer of silicon oxide, then applying a layer of titanium to the silicon oxide layer by vacuum deposition, the oxidizing the titanium at over 550°C to form titanium oxide in the rutile form.

2. Traversal of the Rejection

The proper rejection for a §103 rejection is shown above. As discussed above, claim 37 depends on claim 51 and recites the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over Gibbons. The reasons discussed above also distinguish the invention as recited in claim 51 over Gibbons in view of Groth. Specifically, there is no teaching of a **metal oxide film deposited directly over a crystalline metal oxide film**. Claim 37 is similarly patentably distinguishable over Gibbons in view of Groth. As a result, Applicants respectfully request the consideration and allowance of claim 37.

C. Rejection of Claims 21-52 over Gibbons in view of U.S.

Patent No. 4,522,844 ("Khanna")

In the Office Action at page 7, paragraph 8, claims 21-52 were rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna. The Examiner stated that Gibbons does not specifically mention whether the film is amorphous, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the metal film amorphous as taught by Khanna. Applicants respectfully traverse this rejection.

1. Khanna

Khanna discloses a method of coating a substrate with an amorphous metal comprising the step of bombarding a solid piece of the metal with ions of an inert gas in the presence of a magnetic field to provide a vapor of the metal which is deposited on the substrate at a sufficiently low gas pressure so that there is formed on the substrate a thin, uniformly thick, essentially pinhole-free film of the metal.

2. Traversal of the Rejection

The proper rejection for a §103 rejection is shown above. The present invention as recited in amended claim 21 is a coated product comprising a **second metal oxide film** over the amorphous metal film, wherein the amorphous metal film is oxidized to form a **first metal oxide film**

in the coated product. In contrast to the present invention, Gibbons teaches a plastic substrate having a primer layer made up of a pure metal or a partially oxidized metal and a **metal layer directly over the primer layer**. Gibbons teaches a metal layer directly over the primer layer because the invention relates to an adhesion promoting layer for improving the adhesion between a metal layer and a plastic substrate. The Examiner uses Khanna to teach the metal film is an amorphous film. Hence, Gibbons in view of Khanna does not teach a **second oxide film deposited directly over a first oxide film** as recited in claim 21. As a result, claim 21 is patentably distinguishable over Gibbons in view of Khanna, and Applicants respectfully request the consideration and allowance of claim 21.

Claims 22-35, 44-47 and 49 directly or indirectly depend on claim 21 and recite the present invention in varying scope. Applicants have discussed above how claim 21 is patentably distinguishable over the cited references, and claims 22-35, 44-47 and 49 are similarly patentably distinguishable over Gibbons in view of Khanna. As a result, Applicants respectfully request the consideration and allowance of claims 22-35, 44-47 and 49.

The present invention as recited in amended claim 43 is a coated article comprising a second titanium oxide film deposited directly over the first titanium oxide film. In contrast to the present invention, Gibbons teaches a plastic substrate having primer layer made up of a pure metal or a partially oxidized metal and a metal layer directly over the primer layer. Further as discussed above, Gibbons teaches against both layers being comprised of titanium oxide. The Examiner uses Khanna to teach the metal film can be amorphous.

Hence, a combination of Gibbons and Khanna does not teach a **second titanium oxide film deposited directly over a first titanium oxide film** as recited in claim 43. As a result, the present invention as recited in claim 43 is patentably distinguishable over Gibbons in view of Khanna, and Applicants request consideration and allowance of claim 43.

Amended claim 48 recites a coated product **consisting essentially of** a substrate; and a metal oxide film. As discussed above, Gibbons teaches an adhesion-promoting layer and a metal layer. The Examiner stated Khanna

teaches the metal film can be amorphous. Hence, the combination of Gibbons and Khanna does not teach all the limitations of claim 48 so claim 48 is patentably distinguishable over Gibbons in view of Khanna. Applicants respectfully request the consideration and allowance of claim 48.

Similarly to claim 43, claim 51 recites a coated product having a **metal oxide film directly over the crystalline metal oxide film**, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film. For the reasons discussed above, Gibbons in view of Khanna does not teach a **meta oxide film deposited directly over a crystalline metal oxide film** as recited in claim 51. As a result, the present invention as recited in claim 51 is patentably distinguishable over Gibbons in view of Khanna, and Applicants request consideration and allowance of claim 51.

Claims 36 and 37 depend on claim 51 and recite the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over the cited references, and claims 36 and 37 are similarly patentably distinguishable over Gibbons in view of Khanna. As a result, Applicants respectfully request the consideration and allowance of claims 36 and 37.

D. Rejection of Claim 37 over Gibbons in view of Khanna and further in view of Groth

In the Office Action at page 10, number 9, claim 37 was rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna as applied to claims 21-52 and further in view of Groth. The Examiner stated that Gibbons does not mention a thermal oxidation temperature, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to thermally oxidize at a temperature between 400°C and 500°C as taught by Groth.

The proper rule for a rejection under 35 U.S.C. §103 is shown above. As discussed above, claim 37 depends on claim 51 and recites the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over Gibbons in view of Groth and Gibbons in view of Khanna. The reasons discussed above also distinguish the invention as recited in claim 51 over Gibbons in view of Khanna and further in view of

Groth. Specifically, there is no teaching of a **metal oxide film deposited directly over a crystalline metal oxide film**. Claim 37 is similarly patentably distinguishable over Gibbons in view of Khanna and further in view of Groth. As a result, Applicants respectfully request the consideration and allowance of claim 37.

III. CONCLUSION

In light of the remarks presented in this correspondence, Applicants respectfully request the withdrawal of the following rejections: claims 21-52 were rejected under 35 U.S.C. §102(e) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Gibbons; claim 37 is rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons as applied to claims 21-52 above and further in view of Groth; claims 21-52 were rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna; claim 37 was rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna as applied to claims 21-52 and further in view of Groth; and allowance of claims 21-52.

If any questions remain about this application, the Examiner is requested to contact Applicants' attorney at the telephone number provided below. Thank you.

Respectfully submitted,

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